

What is claimed is:

1. A copper metallization structure, comprising:
a dielectric pattern formed on a surface of a
5 substrate;
a first Ru layer formed on the dielectric pattern;
an oxide film formed in a surface region of the first
Ru layer;
a second Ru layer formed on the oxide film; and
10 a Cu layer formed on the second Ru layer.
2. The copper metallization structure of claim 1, wherein
the substrate is a silicon substrate.
- 15 3. The copper metallization structure of claim 1, wherein
the first Ru layer and the second Ru layer are formed by
using a sputtering or CVD(chemical vapor deposition) and has
a thickness in a range from about 80 angstroms to about 120
angstroms.
- 20 4. The copper metallization structure of claim 1, wherein
the oxide film is made of Ru_xO_y formed by a plasma treatment
using N_2O or O_2 .
- 25 5. The copper metallization structure of claim 4, wherein
the thickness of the oxide film is about 250 angstroms,

which is obtained by oxidizing an upper part of the first Ru layer.

6. The copper metallization structure of claim 4, wherein
5 the ratio of $x:y = 1:2$.

7. A method for copper metallization, comprising the steps of:

forming a dielectric pattern on a surface of a
10 substrate;

forming a first Ru layer on the dielectric pattern;

forming an oxide film in a surface region of the first
Ru layer;

forming a second Ru layer on the oxide film; and

15 forming a Cu layer on the second Ru layer.

8. The method of claim 7, wherein the substrate is a silicon substrate.

20 9. The method of claim 7, wherein the first Ru layer and the second Ru layer are formed by using a sputtering or CVD(chemical vapor deposition) and has a thickness in a range from about 80 angstroms to about 120 angstroms.

25 10. The method of claim 7, wherein the oxide film is made of Ru_xO_y formed by a plasma treatment using N_2O or O_2 .

11. The method of claim 10, wherein the thickness of the oxide film is about 250 angstroms, which is obtained by oxidizing an upper part of the first Ru layer.

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12. The method of claim 10, wherein the ratio of $x:y = 1:2$.

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